

What is claimed is:

1. A continuous method for preparing a fluid diffusion layer comprising a substrate and at least one loading material adhered to the substrate, wherein the at least one loading material is adhered to the substrate by the steps of:

- (a) continuously applying a loading composition comprising the at least one loading material to the substrate;
- (b) continuously compacting the substrate and the loading material applied thereto by applying pressure from at least one compaction roller; and
- (c) drying the substrate and the loading composition applied thereto.

2. The method of claim 1, wherein the compacting step is characterized by:

compacting the substrate and the loading material between two compaction rollers.

3. The method of claim 2, wherein the two compaction rollers are separated by a predetermined gap.

4. The method of claim 3, wherein the two compaction rollers apply compacting pressure equivalent to at least 1 bar to the substrate and

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the loading composition.

5. The method of claim 1, wherein the substrate is pretreated with a hydrophobic polymer before step (a).

6. The method of claim 1, further comprising:

(d) sintering the fluid diffusion layer.

7. The method of claim 6, further comprising:

- 5 (e) continuously applying an electrocatalyst composition comprising at least one electrocatalyst to the fluid diffusion layer;
- (f) continuously compacting the fluid diffusion layer and the electrocatalyst applied thereto by applying pressure from at least one roller; and
- 10 (g) drying the fluid diffusion layer and the electrocatalyst composition applied thereto;

whereby the fluid diffusion layer and the
15 electrocatalyst form an electrode.

8. The method of claim 7, wherein step (f) is characterized by:

compacting the fluid diffusion layer and the electrocatalyst between two compaction
5 rollers.

9. The method of claim 1, further comprising the step of protecting at least one compaction roller from soiling by disposing a separation film between the protected compaction
5 roller and the loading material.

10. The method of claim 9, wherein the separation film travels across the protected roller from a first reel to a second reel, whereby clean separation film is continuously
5 disposed between the protected compaction roller and the loading material.

11. The method of claim 1, wherein the loading composition is applied to only one side of the substrate.

12. The method of claim 1, wherein the loading composition comprises a liquid.

13. The method of claim 12, wherein the liquid is water.

14. The method of claim 12, wherein the substrate and the at least one loading composition are partially dried before the compacting step.

15. The method of claim 14, wherein the loading composition is partially dried to remove about 40% or less of the water.

16. A continuous method for preparing a fluid diffusion electrode comprising a fluid diffusion layer and at least one electrocatalyst adhered to the fluid diffusion layer, wherein the
5 at least one electrocatalyst is adhered to the fluid diffusion layer by the steps of:

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- (a) continuously applying an electrocatalyst composition comprising the at least one electrocatalyst to the fluid diffusion layer;
- (b) continuously compacting the fluid diffusion layer and the electrocatalyst composition applied thereto by applying pressure from at least one compaction
15 roller; and
- (c) drying the substrate and the electrocatalyst composition applied thereto.

17. The method of claim 16, wherein step (b) is characterized by:

compacting the fluid diffusion layer and the
electrocatalyst between two compaction
5 rollers.

18. The method of claim 16, further
comprising the step of disposing a separation
film between the at least one compaction roller
and the electrocatalyst.

19. The method of claim 18, wherein the
separation film travels across the protected
roller from a first reel to a second reel,
whereby clean separation film is continuously
5 disposed between the protected roller and the
electrocatalyst.

20. The method of claim 16, wherein the
fluid diffusion layer and the electrocatalyst
composition are partially dried before the
compacting step.